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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/331,763	06/25/1999	KAZUTO NISHIDA	177/526327	2049

7590

07/16/2003

WENDEROTH LIND & PONACK  
2033 K STREET NW  
SUITE 800  
WASHINGTON, DC 20006

EXAMINER

MEREK, JOSEPH C

ART UNIT	PAPER NUMBER
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3727

DATE MAILED: 07/16/2003

27

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/331,763

Applicant(s)

NISHIDA, KAZUTO

Examiner

Joseph C. Merek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 39-57, 77-79, 83-86 and 88-92 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39-57, 77-79, 83-86 and 88-92 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 18.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims 58-76, 80-82, 87, and 93 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 26.

Applicant's election with traverse of Group I in Paper No. 26 is acknowledged. The traversal is on the ground(s) that there is no burden to the examiner to examine the claims of group I since they have already been searched. This is not found persuasive because this does not acknowledge the continuing burden of additional searching due to the divergence of the method and apparatus claims. The examiner has proven the burden since the inventions have a different classification. The continued prosecution will require additional searching. The instant invention was filed as a 371 case and was a restriction was not made due to the difference in lack of unity practice. Applicant has since filed a CPA that makes the application now subject to US restriction practice. The restriction was made with regard to the ongoing search burden of the apparatus claims in light continued prosecution and future amendments.

The requirement is still deemed proper and is therefore made FINAL.

***Specification***

The amendment filed 4/25/02 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: there is no support for the softening of the circuit board.

Applicant is required to cancel the new matter in the reply to this Office Action.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 77, 83, 86, 88 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 86 and 88, it has not been adequately disclosed that the heat applied during the bonding process has any softening effect on the circuit board. The specification previous to the amendment of 4/25/02 did not state that the circuit board is softened during the heating process. The specification stated that the heating process softened the resin. There is no support for this limitation in the original specification. Regarding claims 77 and 83,

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there is no support for the correcting the warping of the electronic component. This is a new matter rejection.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 39-43, 45, 48, 54, 77, 78, 86, and 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542. Regarding claims 39-42, 45, 48, 54, and 77, Murakami does not teach the resin being in a solid form prior to heating and bonding. Tsukagoshi et al '542, teaches that the resin can be in either a liquid or in a solid (sheet) form (see Col. 5, lines 9-14 of Tsukagoshi et al). It would have been obvious to employ the solid or sheet form of resin in the process of Murakami since it is taught by Tsukagoshi et al '542 that either form of adhesive is acceptable. Moreover, the solid form is more readily applied. Murakami does not teach the resin flowing to an edge of the electronic component. Tsukagoshi et al '542, as seen in Fig. 5, 6, and 8, teaches flowing of the resin to the edge of the electronic component. It would have been obvious to allow the resin to flow to the edge of the electronic component or above to provide more bonding surface area between the resin and the component. Regarding claim 43, Murakami does not teach the sheet being thicker than the gap. Tsukagoshi et al '542, as seen in Figs. 8 and 9, teaches the sheet being thicker than the gap. It would have been obvious to employ the thicker sheet of Tsukagoshi et al '542 in the method of Murakami to provide a stronger bond or more

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bonding material. See Fig. 8 of Tsukagoshi et al '542 where the bonding material 16 is up the sides of the component. Regarding claim 78, the modified method of Murakami discloses the claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Regarding claims 86 and 87, the modified process Murakami teaches that the heat softens the resin to produce the bonding. The resin is in sheet form initially and then softened to produce bonding. Regarding claim 91, Murakami does not teach the inorganic filler. Tsukagoshi et al teaches using metal-coated particles. It would have been obvious to employ the metal-coated particles of Tsukagoshi et al in the resin of Murakami to provide for a better connection between the chip and the substrate. Some of the metal-coated particles are the inorganic filler.

Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al as applied to claim 39 above, and further in view of Grupen-Shemansky. The modified method of Murakami does not teach the inorganic filler, i.e. silica. Grupen-Shemansky teaches using silica in the resin. It would have been obvious to employ the silica of Grupen-Shemansky to provide for the dielectric resin as taught by Grupen-Shemansky.

Claims 44, 46, 47, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 as applied to claim 39

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above and further in view of Tang et al. Regarding claims 44 and 56, the modified process of Murakami does not teach the use of a sheet of anisotropic thermosetting resin. Tang et al teaches bonding a component to a circuit board using a sheet of anisotropic thermosetting resin. It would have been obvious to employ the resin of Tang et al in the method of Murakami for compensating in deviations in the planarity of the board as taught by Tang et al. Regarding claim 46, the particles of Tang et al are conductive. Regarding claims 47 and 57, Tang et al teaches a conductive coating of nickel and gold but does not teach it as the conductive coating for the particles. It would have been obvious to employ it for the particles to eliminate the need for another or different coating for the particles.

Claims 49 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view Tsukagoshi et al '542 and Tang et al as applied to claim 48 above, and further in view of Matsumoto et al '069. Regarding claim 49, the modified method of Murakami does not teach the conductive adhesive applied to the bumps. Matsumoto et al '069, teaches the use of conductive adhesive on the bumps. It would have been obvious to employ the conductive adhesive of Matsumoto et al '069 in the modified method of Murakami to provide a better or stronger bond. Regarding claim 53, the bumps are forced through the resin and the paste as part of the bumps are hardened prior to adhesion to the board.

Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542. Regarding claim 50, the modified process or method of Murakami does not teach the use of flux. Official notice is taken that it is well known to apply flux to metal joints. It would have been obvious to employ flux to the electrodes of Murakami to provide a better bond.

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and further in view of Gruppen-Shemansky et al. The modified process or method of Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond.

Claim 52, 83, 84, 88, and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and Gruppen-Shemansky et al and further in view of Matsubara et al. Regarding claim 52 Murakami does not teach the resin being in a solid form prior to heating and bonding. Tsukagoshi et al '542, teaches that the resin can be in either a liquid or in a solid (sheet) form (see Col. 5, lines 9-14 of Tsukagoshi et al). It would have been obvious to employ the solid or sheet form of resin in the process of Murakami since it is taught by Tsukagoshi et al '542 that either form of adhesive is acceptable. Moreover, the solid form is more readily applied. Murakami does not teach the resin flowing to an edge of the electronic component. Tsukagoshi et al '542, as seen in Fig. 5, 6, and 8, teaches flowing of the resin to the edge of the electronic component. It would have been obvious to allow the resin to flow to the edge of the electronic component or above to provide more bonding surface area between the resin and the component. The modified method of Murakami does not teach the sheet having holes corresponding to the electrodes and the holes filled with conductive particles. Gruppen-Shemansky et al as seen in Figs. 1-3, teaches a sheet 12 of adhesive with holes filled with conductive particles. It would have been obvious to employ the sheet of Gruppen-Shemansky et al in the method of Murakami to provide a stronger bond. The modified method of Murakami does not teach the use of



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large particles or the ultrasonic vibrations. Tsukagoshi et al '542, teaches the use of large particles. It would have been obvious to employ the particles of Tsukagoshi et al '542 in the method of Murakami to provide spacing. Matsubara et al teaches the use of ultrasonic vibrations in the bonding step. It would have been obvious to employ the vibrations of Matsubara et al in the method of Murakami to provide a better bond.

Regarding claims 83 and 88, these actions occur at approximately the same time. The pressing occurs while heating. The pressing provides the warping correction.

Regarding claim 84, the modified process of Murakami discloses the claimed invention except for specific temperature range of 140 to 230 degrees C and the time being less than 20 seconds. It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the temperature and heating time, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Moreover, Tsukagoshi et al '542 as seen in claims 3 and 4, that the adhesive has a thermal activation temperature of 70 to 200 degrees C. Regarding claim 88, the modified process of Murakami teaches that the heat hardens the resin to produce the bond but does not teach that the heat softens the resin to produce the bonding. Tsukagoshi et al '542, as seen in Col. 12, lines 27-33 and Col. 12, lines 46-60, teaches that the resin is a sheet prior to heating and is made fluid to provide the bonding. It would have been obvious to employ the resin of Tsukagoshi et al '542 in the process of Murakami to provide an alternative resin. Moreover, Tsukagoshi et al teaches that the resin can be initially hard or initially soft depending upon the type chosen. Regarding claim 92, some of the coated particles are the inorganic filler. Moreover, Grupen-Shemansky teaches the silica in the resin. It would have been

obvious to employ the silica in the resin of Murakami to provide the dielectric resin as taught by Grupen-Shemansky.

Claim 90 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and Grupen-Shemansky et al and further in view of Matsubara et al as applied to claim 52 above, and further in view of Ryoichi (JP 8-162498). Regarding claim 90, the modified method of Murakami teaches the component is pressed under heating to the circuit substrate but does not specifically teach a heated tool for holding the component. Ryoichi, as seen in Fig. 1, teaches 6, a heated tool for holding the chip or component and pressing it to the substrate. It would have been obvious to employ the heated tool of Ryoichi in the method of Murakami to provide a simple way to press the heat and press the chip as required by Murakami. The electrodes are aligned prior to pressing as shown in the Figs. 1 and 4 of Ryoichi therefore the tool aligns the electrodes.

Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 and Grupen-Shemansky et al as applied to claim 52 above, and further in view of Tatusko et al. Regarding claim 85, the modified process or method of Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

Claim 79 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami in view of Tsukagoshi et al '542 as applied to claims 39 and 58 above and further in view of Tatusko et al (US 3,777,220). Regarding claim 79, the modified method of Murakami, as seen in Col. 4, lines 26-28, teaches that the circuit board is a laminate plate with epoxy-containing material but does not teach the glass cloth or the copper cladding. Tatusko et al teaches that glass cloth can be used in an epoxy circuit board and that the cladding is typically copper. It would have been obvious to employ the glass cloth of Tatusko et al in the board of Murakami to reinforce the board and it would have been obvious to employ the copper to provide a good conducting material.

Claims 39-42, 45-48, 54, 77, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eldring (DE 195 35 282) in view of Tsukagoshi et al '542. Regarding claim 39, Eldering does not teach the solid resin prior to heating and then softened by heating to produce bonding, Tsukagoshi et al '542 teaches that the resin can be in solid (sheet) then softened prior to bonding. It would have been obvious to employ the sheet of Tsukagoshi et al '542 in the process of Eldring to provide an alternative form of adhesive since Tsukagoshi et al '542 teaches that either a liquid adhesive or a solid (sheet) adhesive can be used to produce the required bonding. Eldering does not teach the resin flowing up to the edge of the component. Tsukagoshi teaches the resin flowing up to the edge of the component. It would have been obvious to employ the flowing resin of Tsukagoshi et al in the method of Eldering to provide more surface area for the bond between the component and the resin. Regarding claims 42 and 45, the resin on the board is considered a sheet and is an adhesive. Regarding claim 48, see Fig. 43, where the thickness of the resin sheet prior to aligning, is smaller than the width of the connection 4 between the electrode and the electronic component. Regarding claim 54, the resin sheet is on a side of the circuit board. Regarding claims

77 and 80, the pressing will inherently perform the claimed function of correcting any warping of the electronic component and these actions occur at approximately the same time.

### ***Response to Arguments***

Applicant's arguments filed 1/21/03 have been fully considered but they are not persuasive. Applicant argues that the combination of Murakami and Tsukagoshi et al is not proper since Murakami requires the electrodes to pass through the resin. This argument is not correct. Tsukagoshi et al teaches that the resin can be liquid or solid and has electrodes 17 that must enter the resin a substantial amount to contact the balls in the lower layer. The combination is clear since the electrodes of Tsukagoshi et al must pass through a layer of the resin.

### ***Conclusion***

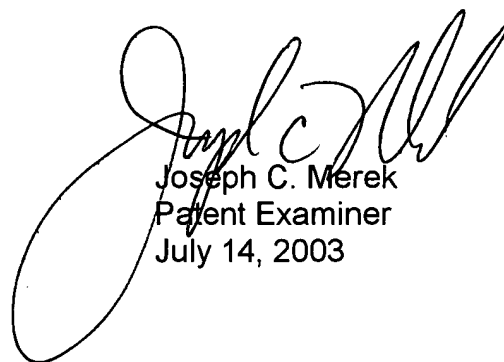
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ellerson et al is cited for teaching a solid connection sheet for connecting an electronic component.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph C. Merek whose telephone number is (703) 305-0644. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lee Young can be reached on (703) 308-2572. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3579 for regular communications and (703) 308-3579 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.



Joseph C. Merek  
Patent Examiner  
July 14, 2003